DPM-3221

Digital DC Power Meter with Data logging capability

User Manual

Introduction

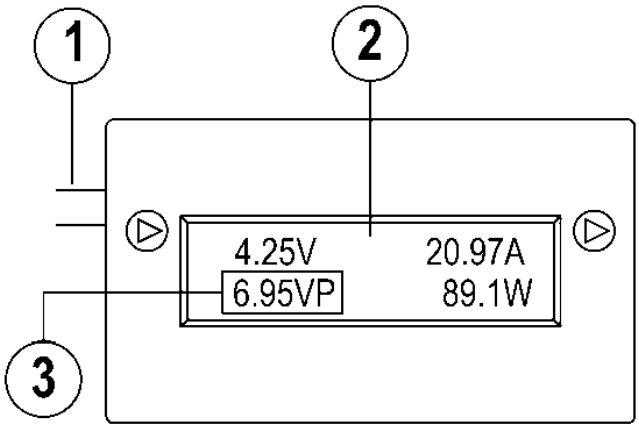
The DPM-3221 digital DC Power Meter measures and displays in real time; DC Voltage (0-60V), DC Current (0-200A with a 200A/50mV* external shunt) and Watts (0-12000W). It also displays; Amp-hour, Watt-hour, maximum or peak Watts, running time since Power Meter start up and minimum and maximum values of voltage and current during the measuring period. The power for the meter can either be from the source or the load whichever has a minimum 5V DC available (only voltages between 5V and 60V can be measured when powered in this way). The Power Meter can also be powered by an external DC voltage of 5 to 60VDC, which then allows a voltage measurement range of 0-60V. Once the Power Meter is powered up it starts to display and log the Voltage and Current. It also displays Wattage, Amp-hours, Watt-hours, Max. & Min. Voltage and Current and peak Watts. The logged data values are recorded at 3 minute intervals. Up to 1,500 sets of data can be stored in the Power Meter's Memory (EEPROM) so even when the Power Meter is powered down, data is retained. The data can be retrieved by a PC using the optional Data Adapter (DPA-3051) and a software program provided. Unless reset, the last set of data values; Ah, Wh, peak Current, peak Watts, (and sometimes min. and peak Voltage), is retained and displayed when the DM-3221 is powered up. A new group of data (up to 20) is created each time. The Power Meter can be mounted using the Snap-On bracket provided or magnetically on ferrous metal surfaces. *50A/50mV and 100A/50mV shunts may also be used with current ranges of 0-50A and 0-100A respectively.

Precautions

a. Do not exceed 60A or 60V DC when using the Power Meter.
b. Do not apply 60A for more than 5 seconds within any 60 second interval.
c. This meter is designed for indoor use only.
d. Do not disassemble or attempt to repair the Power Meter. Return it to your service agent for repair.
e. If the start-up screen does not appear, immediately remove the power source.
f. Do not short-circuit the input or output leads. It is good practice to have both the input and output terminal blocks connected to prevent short circuits.
g. Double check the correct input and output polarity. If the input connection has the wrong polarity, the LCD display will not show. Wrong polarity on the output may result in excessive current flow.
h. Damage to the Power Meter may result if voltage is applied with the wrong polarity.
i. Do not exert pressure directly on the LCD display as damage may occur.

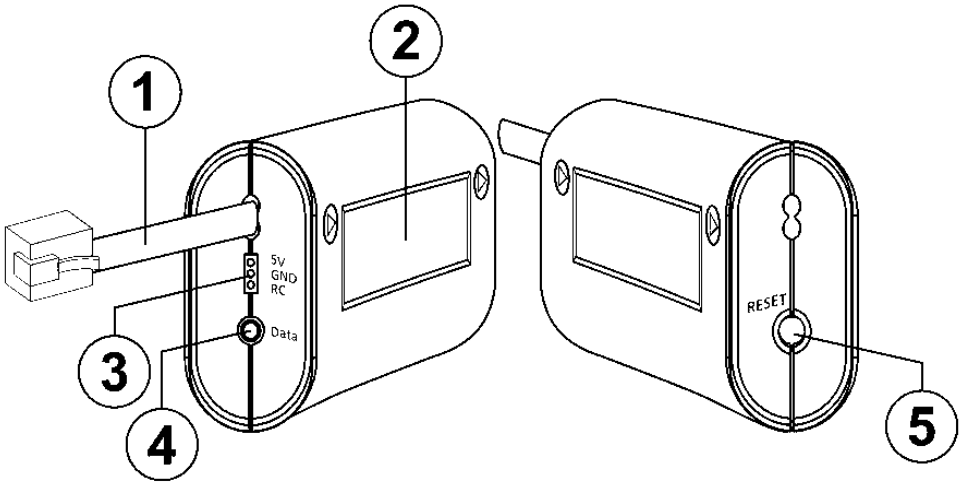
Controls and Indicators

FRONT



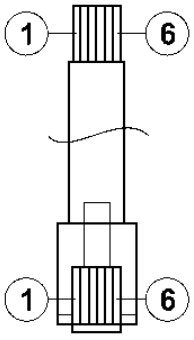
1. Shunt connector : Flat cable with phone plug RJ12 6P/4C.
2. LCD Display : Displays: V, A, and W continuously.
   Scrolling display : Amp Hour (Ah), Watt Hour (Wh), Peak Voltage (Vp), Peak Current (Ap), Peak Watts (Wp), Min. Voltage (Vm) or sag, Min. Current (Am) and total time since power up.
3. Scrolling display : Any one of the scrolling displays can be halted at any time (and also released) by one quick press of the "Reset" button (5)

SIDE



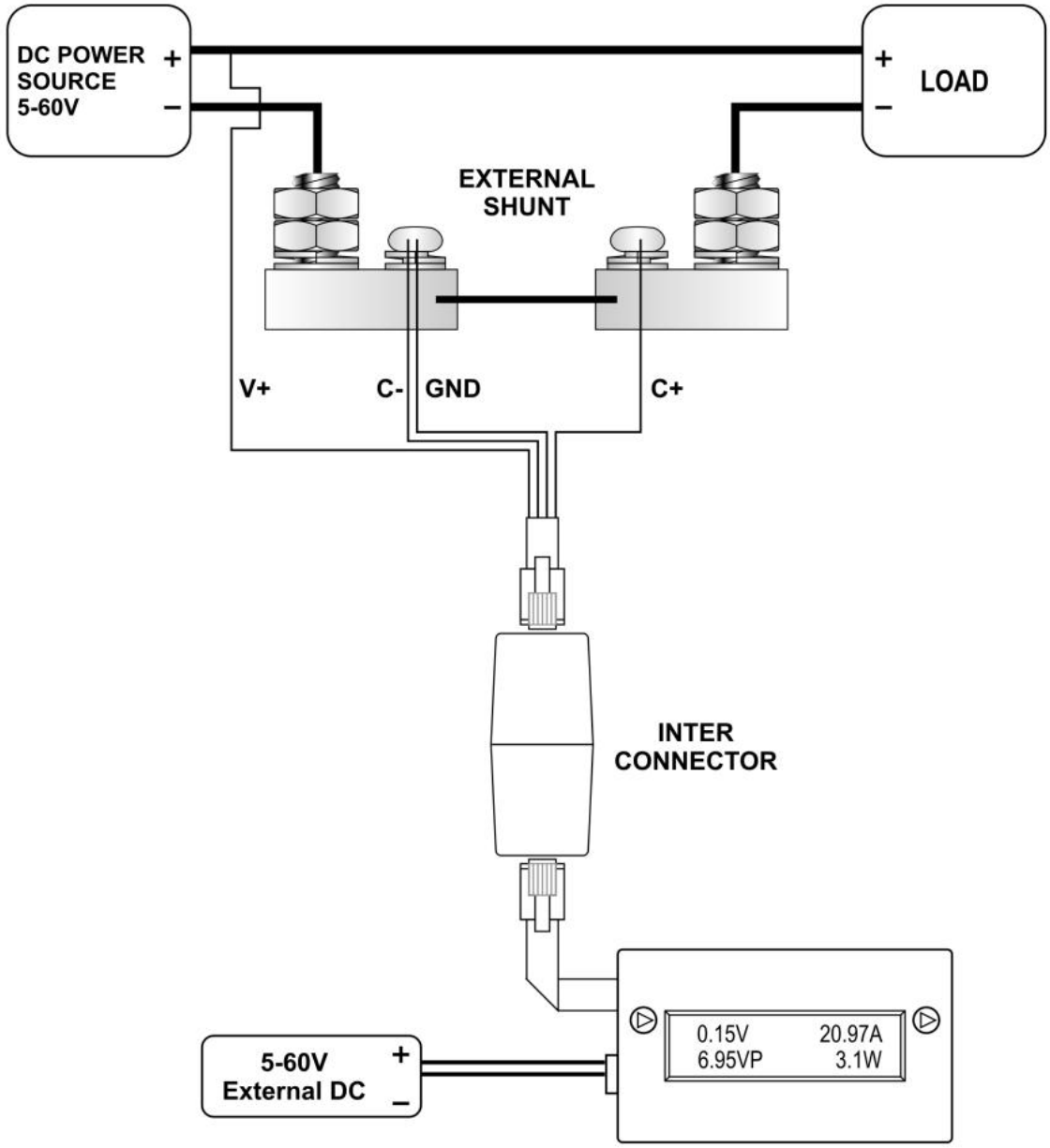
3. External Power Socket:
   An external power source (5-60VDC) extends the measured voltage range from 5-60V to 0-60V.
   Pins: 5V-GND-RC
   5V = +5V to +60V external DC source.
   GND = Ground or negative of external DC source.
   RC = Remote Clear, this is for deleting the stored data and setting the shunt rating.
4. Phono Socket: for connection to optional Data Adapter (DPA-3051).
5. Reset Switch: To clear saved data and to setup the unit and halt/continue display scrolling.

Connector



PIN	**Function**	**Description**	**Wire Colour**
1	C-	SENSOR -	Silver
2	C+	SENSOR +	Yellow
3	NC	No Connection	Green
4	NC	No Connection	Brown
5	V+	Voltage +	Black
6	GND	Voltage -	Blue

Wiring Diagram



Optional external DC supply required if Source 0-60V.

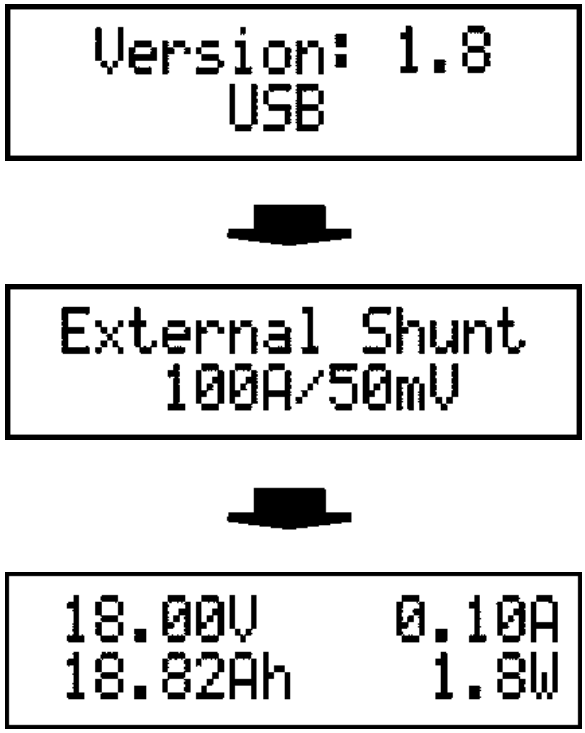
Operation and Display Screens:

Installation of the DC Power Meter:

1. First connect a DC source to the meter and check that the DPM powers up. If no display appears then check for reverse polarity and ensure that the voltage is greater than 5 Volts.
2. The last set of accumulated data will appear on the LCD. The old data can be cleared by pressing the Reset Button for 5 seconds twice. See the “Resetting the DPM-3221” section for more information.
3. Connect the remaining leads to complete the installation of the DC Power Meter.

DISPLAYS:

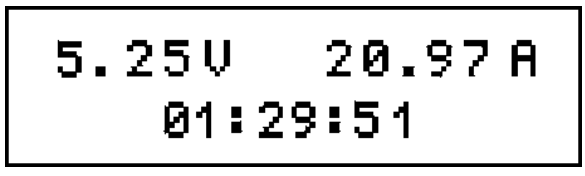
A. On first powering up the display, the firmware version and factory preset data port mode are shown. Then it briefly shows the preset shunt rating of the DPM and finally the data display appears.



B. On the data display, the Volts, Amp and Watt are continuously displayed; all other data is shown cyclically at about 3 second intervals. The display can be toggled between fixed and cyclical by one quick press of the "Reset" button (5).

1. **Current (Amps - A, Peak Amps - Ap, Minimum Amps - Am):**
   The Amps value is the average current through the Meter's black wire over the last screen update interval. Ap is the Peak (maximum) current to the LOAD, since start up to the present time. Similarly, Am is the minimum current.
2. **Voltage (Volts - V, Maximum Voltage – Vp, Minimum Voltage - Vm):**
   The Volts value is the average voltage over the last screen update interval. Vp is the Peak (maximum) voltage from the source side since start up to the present time. Similarly for Vm (minimum) which is the minimum voltage, voltage dip or sag on the source side since start up.
3. **Charge (Amp-hours - Ah):**
   The value displayed is the total charge in Amp-hours delivered to the LOAD since start up. The Amp-hours is determined using the internal clock of the MCU.
4. **Energy (Watt-hours - Wh):**
   The value displayed is the total energy delivered to the LOAD in Watt-hours since start up. The Watt-hours is determined using the internal clock of the MCU.
5. **Power (Watts - W, Peak Watts - Wp):**
   The value displayed is the average power delivered in Meter over the last screen update interval. The displayed Peak Watts value (Wp) is the maximum power drawn of the LOAD, since start up.

C. Operation time since start up:

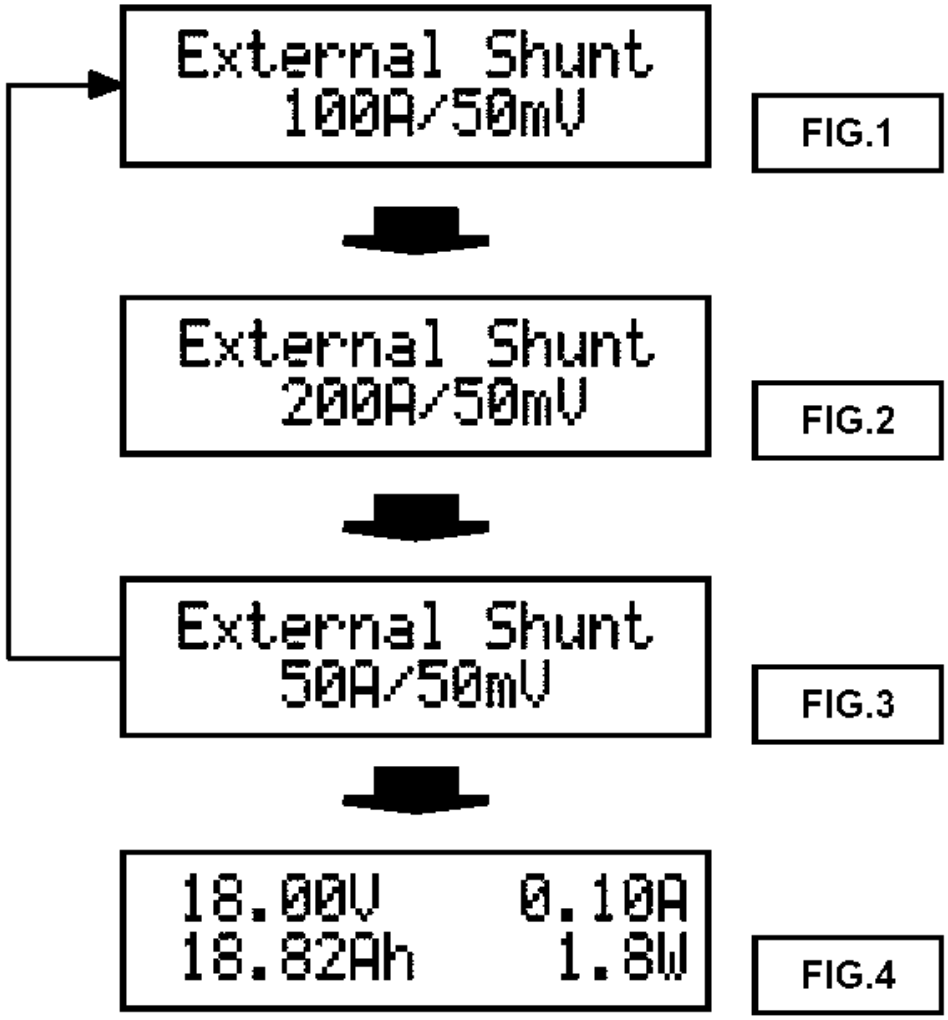


The second line displays the elapsed time since start up in HH:MM:SS format.

Setting the Shunt rating of the DPM

If you want to change the DPM shunt rating to match your shunt, proceed as follows:

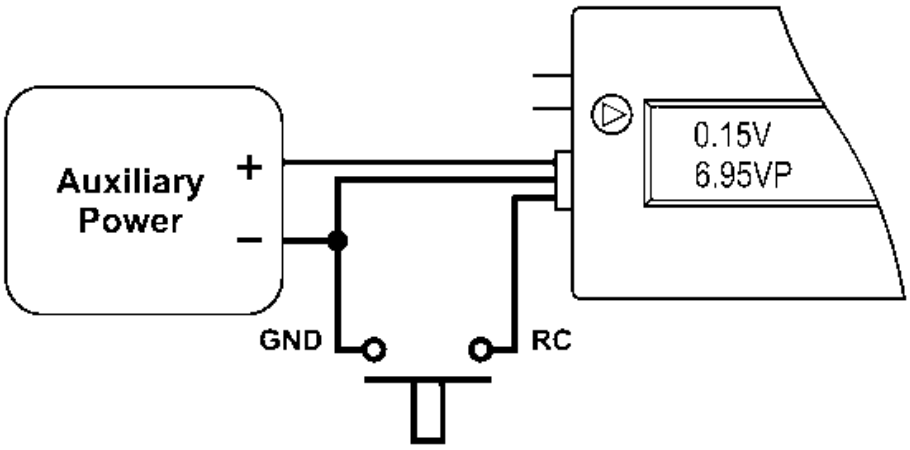
1. After checking the DPM is in good order, power down the unit – if necessary, unplug the phone jack from the interconnector.
2. Plug in the supplied external power plug into the 5V-GND-RC socket. A 9V battery connected to the positive (red) wire and negative (black) wire is best to power the unit whilst the shunt rating is being set.
3. Power up the unit and when the “External Shunt” is displayed, press and hold the reset button for 3 seconds.
4. Release the reset button and note that the LCD will show the current DPM shunt setting. Fig. 1.
5. A quick press on the Reset Button will cycle the shunt setting from 100A to 200 A. Press again for 50A and again to go back to 100A. Fig. 1, 2 and 3. Select the required shunt setting in this way.
6. Make a quick connection of the black (GND) and white (RC) wires to confirm the currently displayed shunt setting and the LCD will then show the normal data display. Fig. 4.
7. Power down the unit and power up again and verify that the “External Shunt” is set correctly.
8. Plug the phone jack into the new shunt and check that the readings are correct.



Resetting the DPM-3221

There are two ways to clear the previously stored data.

1. Press and hold the Reset button (5) until the LCD display indicates “Press again 5 seconds to reset”, then release the Reset button and press again holding for 5 seconds to delete the data.
2. Use the external power source socket and connect the remote I/O (white wire) as shown below. This is marked RC on the side of the DPM to the GND or negative terminal (black wire) for 3 seconds. All previously recorded data is then erased.



SPECIFICATIONS

Model	**DPM-3221 (For use with external shunt)**		
Measured Parameters	**50A/50mV**	**100A/50mV**	**200A/50mV**
Current Range Amp (A)	0-50A cont.	0-100A cont.	0-200A cont.
Voltage Range Volt (V)	5-60V or 0-60V with external DC source		
Power Watt (W)	Max. recorded W:12,000W Resolution of W:0.1W for W<10,000 1W for W>10,000		
Resolution of V&I	0.01V,0.01A	0.01V,0.02A	0.01V,0.05A
Scrolling Display of Registered Parameters:			
Ampere Hour (Ah)	Max. recorded Ah: 99,999Ah Resolution of Ah: 0.01Ah for total recorded Ah <1,000Ah 0.1Ah for 10,000 > total recorded Ah > 1,000Ah 1Ah for total recorded Ah > 10,000Ah		
Peak Watt (Wp) registered	Max. recorded W: 12,000W Resolution of W: 0.1W		
Energy: Kilo Watt Hour (kWh)	Max. recorded kWh: 9999.9kWh Resolution of kWh: 0.1kWh		
Registered Peak Voltage(Vp), Min.Voltage(Vm), Peak Current(Ap), Min. Current(Am), Peak Watt(Wp)	The new high and low values of voltage and current will replace the old ones during the metering period and registered at the end of the metering period		
Accumulative Max. Operation Period logged	75 hours (3 min. data logging interval, 1500 samples)		
Scrolling speed on LCD	3 seconds for one parameter		
Data logging interval	3 minute		
Operation Voltage and Current	5-60V, 12mA		
External DC Source Range	5-60V, 8mA-12mA		
Operation Condition	0℃ to 50℃, non-condensing humidity		
Storage Condition	-10℃ to 60℃		
Construction			
LCD Display	VA = 54mm x 14.4mm, 16 character x 2 row STN 5*8 dots		
Housing Material	Polycarbonate		
Dimension & Weight	75(L) x 45(W) x 23(D) mm 100g approx.		
Supplied Accessories	User manual, snap-on mount & external power cable with plug, phone cable with RJ-12 6P/4C plug, inline RJ-12 coupling.		
Optional Accessories	1. Data adapter module and software for data logging. 2. External DC power box with plug. 3. External shunt modules with 5m phone cable and RJ-12 6P/4C plug.		
Approvals	CE EN 61326 , FCC		

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